REMARKS

This paper is responsive to the Office Action identified above, and is further responsive in any other manner indicated below.

PENDING CLAIMS

Claims 1-17 were pending, under consideration and subjected to examination in the Office Action. Appropriate claims have been amended, deleted and/or added in order to adjust a clarity and/or focus of Applicant's claimed invention. For example, the features of Claims 2 and 7 are incorporated into Claims 1 and 6, respectively, Claims 2 and 7 have been cancelled herein, and new Claims 18 and 19 have been presented. Such changes are unrelated to any prior art or scope adjustment and are simply refocused claims in which Applicant is present interested. At entry of this paper, Claims 1, 3-6, 8-10 and 12-19 will be pending for consideration and examination in the application.

ALL REJECTIONS UNDER 35 USC §§102 AND 103 - TRAVERSED

All 35 USC rejections (*i.e.*, the 35 USC §102 rejection of Claims 1-13 and 15-17 as being anticipated by Sugawara *et al.* (JP 11-258609); and, the 35 USC §103 rejection of Claim 14 as being unpatentable over Sugawara *et al.* in view of Osaki *et al.* (JP 5-107543) are respectfully traversed. Such rejections have been rendered obsolete by the present clarifying amendments to Applicant's claims, and accordingly, traversal arguments are not appropriate at this time. However, Applicant respectfully submits the following to preclude renewal of any such rejections against Applicant's clarified claims.

All descriptions of Applicant's disclosed and claimed invention, and all descriptions and rebuttal arguments regarding the applied prior art, as previously submitted by Applicant in any form, are repeated and incorporated herein by reference. Further, all Office Action statements regarding the prior art rejections are respectfully traversed. As additional arguments, Applicant respectfully submits the following.

Unrelated to any prior art rejection, Claims 2, 7 and 11 now have been cancelled without prejudice or disclaimer of any scope or subject matter and Claims 3, 4, 6 and 8 have had a dependency thereof changed, thus rendering this rejection of such claims obsolete at this time. Patentability of remaining ones of the rejected claims are supported as follows.

In order to properly support a §102 anticipatory-type rejection, any applied art reference must disclose each and every limitation of any rejected claim. The applied art does not adequately support a §102 anticipatory-type rejection because, at minimum, such applied art does not disclose (or suggest) the limitations as discussed in the following remarks from Applicant's foreign representative submitted in support of traversal of the rejection and patentability of Applicant's claims.

The present invention makes use of a surface charge density capable of readily being increased to improve manufacturability of liquid crystal displays. Charge is directly given to the surface of a rubbing cloth which comes into contact with an alignment film (a "rubbing surface"), and the surface of the rubbing cloth is electrically charged by bringing a charge control member into contact with the surface of the rubbing cloth. Namely, in accordance with the line of electrification of the layers as disclosed in the present invention, carriers to be added to the surface

of the substrate member are directly given to the surface of the rubbing cloth. Thus, in the present invention, it is possible to increase the charge density of the rubbing surface up to a maximum holding charge density in the atmosphere. By this, in the present invention, it is possible to keep or minimize any foreign matter from being caused by the friction of the rubbing cloth, and to prevent the foreign matter from adhering again or transferring to the alignment film surface.

That is, in the present invention, rubbing is carried out after carriers are given to the surface of the substrate member, by contact or friction, when the substrate member is rubbed (frictionized) with the rubbing cloth. Charges are excessively given in the mobile state to the surface of the rubbing cloth, and the carriers to be normally given at the time of contacting the surface of the rubbing cloth with the surface of the substrate member are given to the surface of the substrate member.

Since it is impossible to directly observe the transfer of the charge carriers, the potential value is obtained by observation of the change in the surface potential as the result of the transfer of the carriers. Thus, the potential value itself is an index indicating the amount of transferred carriers. However, the polarity (plus or minus) added to the potential value indicates the direction of transfer of the carriers. Therefore, the potential value has an essential significance.

As an example, if the carriers normally to be given to the surface of the substrate member are excessively given to the surface of the rubbing cloth, the carriers to be normally given to the surface of the rubbing cloth from the surface of the substrate member are needed in an amount smaller than the case where the substrate is rubbed (frictionized) with the surface of the rubbing cloth in the state that no carrier has been given. Namely, as the result of rubbing, normally, carriers having

different polarities (plus and minus) are accumulated separately to the rubbing cloth and the substrate member, both of which are electrically neutral, and the numbers of carriers having different polarities gradually increase in the respective materials constituting the layers (the rubbing cloth layer and the substrate layer). In comparison with this, the present invention requires only that the carriers having one polarity (plus or minus) in the mobile state, which are excessively given to the rubbing cloth by the greater case of contact, are transferred to the substrate member from the rubbing cloth.

From the microscopic point of view of frictional forces, the attractive force between the carriers having different polarities (plus and minus) is one element, and the attractive force of the carriers having only one polarity is not superior to the attractive force between the carriers having different polarities. According to the present invention, for example, the friction between the rubbing cloth and the substrate member made of SiN can be maintained to be smaller and the wear of the rubbing cloth can be reduced.

An important feature of the present invention is to give carriers to be given to the surface of a substrate member directly to the surface of a rubbing cloth in the mobile state, by contacting the surface of the rubbing cloth (made of insulating material) with the surface of the substrate member, in accordance with a member of layers having different conductivities to each other. On the other hand, in the technique disclosed in the cited references, charge is given only to a conductor and not to the surface of the rubbing cloth with the rubbing cloth itself being kept in the electrically neutral state.

Turning now to further rebuttal arguments regarding the applied art, the technique disclosed in Sugawara *et al.* is to induce charge to the rubbing surface of a rubbing cloth (4) by giving charge to the side of a conductor (conductive layer) (13), which does not come into contact with a substrate (10) of the rubbing cloth (4). In the technique disclosed in Sugawara *et al.*, charge is given only to the conductor and is not given to the surface of the rubbing cloth, therefore, the rubbing cloth itself is kept in the electrically neutral state.

Such arrangement is disadvantageous in that the electric field made by the charge of the conductor surface attenuates in inverse proportion to square of the distance from the charge, and the rubbing cloth (4) is electrically neutral and the thickness of the rubbing cloth (4) is usually 4-5 mm. Accordingly, in order to induce a large charge to the rubbing surface by the technique disclosed in Sugawara *et al.*, a considerably large charge has to be given to the conductor (13). Thus, in the technique disclosed in Sugawara *et al.*, it is impossible that the carriers given to the conductor transfer to the surface of the rubbing cloth which is an insulator, and in view of the volume element of the rubbing cloth which comes into contact with the substrate member, the rubbing cloth is electrically neutral.

From this fact, the technique disclosed in the cited reference can not resolve the problem of the intrinsic transfer of the carriers in electrostatic charge generated by unavoidable contact and friction during rubbing. Accordingly, it is unavoidable to accumulate plus and minus carriers separately to the rubbing cloth and the substrate member, both of which are electrically neutral, by contact and friction. By means of controlling the voltage of a conductor, in appearance, this essential problem merely seems to be dissolved. However, in reality, in the case of the technique disclosed in

this cited reference, the numbers of plus and minus carriers are increasing at the surfaces of the materials (the rubbing cloth and the substrate member), and the attractive force between the plus and minus carriers becomes large (if the respective plus and minus carriers exist in approximately the same number, the attractive force is in proportion to square of the number). Thus, the frictional force becomes large and acceleration of the ware of the rubbing cloth is brought about.

For example, it is apparent from a detailed chemical analysis carried out by the present inventors that in the case of the friction between the rubbing cloth and the SiN substrate member, the rubbing cloth having relatively low mechanical strength is plucked away by the attractive force between the SiN substrate member and the rubbing cloth, and the foreign matter originating from the rubbing cloth adheres to the surface of the substrate member (Tabira *et al.*, 'Precision rubbing supported by fine process analysis," Journal of the Society for Information Display, Vol. 10, No. 4, pp. 329-337 (2002)).

Osaki *et al.* is the secondary cited reference which indicates a technique to carry out a rubbing process by using the amount of static electricity generated on the surface of a rubbing roller during the rubbing process, as the index for setting the condition of the rubbing process. Accordingly, Osaki *et al.* does not disclose separately giving a charge in a positive manner to the rubbing surface.

The present invention is based on an entirely novel concept that the charge density of a rubbing surface can readily be increased by contacting the charge control member directly with the rubbing surface. Accordingly, the present invention is not anticipated by Sugawara *et al.*, in which charge of the rubbing surface is given to by induction, or in view of Osaki *et al.*, which does not describe about the member

for directly giving charge to the rubbing surface. Therefore, the potential control of the present invention by means of directly giving charge to the surface of the rubbing cloth is clearly different from the technique disclosed in the cited references.

As a result of all of the foregoing, it is respectfully submitted that the applied art would not support a §102 anticipatory-type rejection or §103 obviousness-type rejection of Applicant's claims. Accordingly, reconsideration and withdrawal of such §§102 and 103 rejections, and express written allowance of all of the rejected claims, are respectfully requested.

SUPPORT FOR SUBSTITUTE/ADDED CLAIMS

In order to preclude renewal of any previous 35 USC rejections with respect to substitute/added (*i.e.*, clarified/refocused) claims, Applicant respectfully submits the following.

For example, with respect to clarified Claims 1 and 6, from the descriptions of Examples and Figs. 7 and 9 in the present application, the charge is given to by the charge control member is one surface of the rubbing cloth provided onto the surface of the rubbing roller, the one surface of the rubbing cloth coming into contact with the alignment film (see, particularly, page 17, lines 5-18 and page 19, line 25-page 20, line 13). Further, the recitation in new Claims 18 and 19 that the surface of the charge control member which comes into contact with the rubbing cloth is made of a polyimide resin, is supported at, *e.g.*, page 17, line 19 to page 18, line 15.

Accordingly, Applicant respectfully submits that all presently-pending claims are in condition for allowance, and reconsideration is respectfully requested.

EXAMINER INVITED TO TELEPHONE

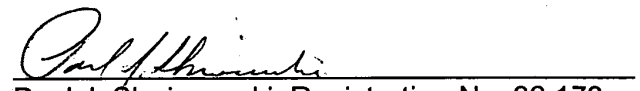
The Examiner is invited to telephone the undersigned at the local D.C. area number 703-312-6600 to discuss an Examiner's Amendment or other suggested action for accelerating prosecution and moving the present application to allowance.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that all the claims listed above as presently being under consideration in the application are now in condition for allowance. Accordingly, early allowance of such claims is respectfully requested.

A Petition for an appropriate extension of the shortened statutory period for response set by the 14 March 2003 Office Action is attached hereto. To whatever other extent is actually appropriate and necessary, Applicant respectfully petitions for an extension of time under 37 CFR §1.136. No claims fees are required for entry of this Amendment. A Form PTO-2038 is attached hereto authorizing payment of the requisite Petition fee. Please charge any shortage in the fees due in connection with the filing of this paper to ATSK Deposit Account No. 01-2135 (Case 520.41012X00).

Respectfully submitted,



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ATTACHMENTS:
Petition for Extension of Time
Form PTO-2038 (Fee Code 1252)